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Marketing of fish and fishery products in Dinajpur and Livelihoods of the fish retailers

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Abstract
Marketing of fish and fishery products in Dinajpur and livelihoods of the fish retailers were studied during the period from January to May, 2013. A total of 60 fish retailers were interviewed for obtaining pertinent data. A survey questionnaire was developed, pre-tested and finally used for collection of data. The collected data were tabulated using conventional statistical tools. The result showed that the livelihoods of a large number of people are associated with fish and fishery products distribution and marketing in six different markets. Three types of marketing channel were found to be operated in the selected markets. The shorter marketing chain which included the fish farmers, retailers and consumers was found to be more beneficial to the fish producers. Fish traders in village markets generally operate a capital of around TK. 8,000-10,000 and traders in town markets a capital of around TK. 10,000-20,000 per day. It was found that most of the fish traders used their own money. Price of fish depends on market structure, species, and freshness, supply demand of fish and size of fishes. There are seasonal variation in prices with the highest in summer (March to May), and lowest in pre-winter: (September to November) during the fish harvesting season. Different types of dried and salted fish were sold in the markets. Traders have broadly improved their food consumption facilities, standard of living, and purchasing power as an economic sector. However, the unhygienic conditions of the marketplace, lack of ice facilities, poor infrastructure, inadequate storage and poor transportation facilities were reported to be the major constraints hindering the marketing system in the surveyed areas. It is therefore necessary to provision of governmental, institutional and banking assistance for improvement of the marketing system.

Keywords: Marketing, fish and fishery products, Dinajpur and livelihoods, fish retailers

Introduction
Bangladesh is a land of rivers and Dinajpur town stands on the bank of the Punorvoba River. It covers an area of around 3444.3 square km and about 414 km far from the capital city of Dhaka. The adjacent districts are Thakurgaon, Panchagarh, Nilphamari, Rangpur, Gaibandha and Joypurhat. All these are important for ponds, beels and rivers. The main rivers of Dinajpur district are Atrai, Korotoa, Punorvoba, Dhepa etc. In several areas of Dinajpur district hatchery and pond fish culture is practiced. During winter season most of the ponds and rivers become dry. Every year especially during winter season a large amount of fishes such as small indigenous species (SIS) and other Indian major carps are transported to Dinajpur town from several districts. Dinajpur district is one of the aquatic resources for freshwater fish habitat. Numerous indigenous fish species and many exotic fishes are cultured around Dinajpur. Communications with the 13 upazilas of Dinajpur districts Sadar, Kaharol, Ghoraghat, Birol, Khansama, Parbatipur, Hakimpur, Birampur, Bochaganj, Chirirbandar, Fulbari, Nowabganj and Birganj all are prominent for different types of natural water resources where many types of SIS are found round the year with their local and exotic fishes. From all sorts of aspects, Dinajpur district is an important area for fish marketing. A number of fish markets are situated around the district town such as Bahadur bazaar, Rail bazaar, Chalk bazaar, Pulhat bazaar, Sikder bazaar, Khanpur bazaar etc. Fishes from different localities are regularly transported to these markets through different transport systems for consumption of town dwellers and other people. Some marine fishes (iced or dried), prawns are also regularly sold in these markets. Information on these aspects of Dinajpur town is insufficient. Therefore, it is essential to know the fish marketing system, availability of fish species in markets and price variations in several markets of Dinajpur district. According to Chaston (1987) [1], a fisherman in a small rural

community who lands a catch in excess of his need and seeks to exchange the fish for another product is implicitly involved in the activity of fish marketing. According to Shang (1981) [8], the return of farm depends on production level and market prices, the price usually fluctuating seasonally due to variations in the supply and demand.

In The primary market the fishermen/farmers sell the catch to primary fish traders who may be known as a *mahajan* or *aratder*. Primary fish trader may buy through a local agent *(dalal)* who typically earns 1-5% commission for his services. The primary traders sell the fish in a wholesale market to local retailers *(nickaries)*, local wholesalers *(paikers)*, or distributors *(beparies* or *chalanies)* who transport the fish to other districts. The sale is normally carried out through the medium of a commission agent *(aratder)* who conducts public auctions. From the secondary market fish is transported at a distance by the distributors *(bepari/chalani)* to wholesaler market in district town. After procuring at the higher secondary markets, local wholesalers *(paikers)* sell to consumers through retailers *(nickaries)*. Communication among the traders in different markets takes place with mobile phone, telephone, which keeps wholesale prices in line throughout in the country. The least informed party is the fishermen, because of their physical isolation from the markets.

Materials and methods
The study was conducted in six markets in Dinajpur sadar upazila in Bangladesh. Study period was carried out during January to May, 2013. It was based on market survey, obtaining information through a sample survey among fish traders. The survey method was chosen in the present study because it was thought to be more advantageous. There are many fish markets in Dinajpur sadar- among them six markets (3 town markets and 3 village markets): Bahadur bazaar, Chalk bazaar, Rail bazaar, Pulhat bazaar, Sikder bazaar, Khanpur bazaar were selected as study areas. In the selected areas a total of 60 fish retailers were interviewed for obtaining pertinent data. A survey questionnaire was developed, pre-tested and finally used for collection of data. Data for the present study were collected for five months from January to May, 2013. A collection method was divided into 3 steps; these were 1) Questionnaire interview: For questionnaire survey, fish traders were selected through simple random sampling method. Interviews were conducted at the market centre during marketing time., 2) Focus group discussion with intermediaries: FGD was conducted with intermediaries in Dinajpur sadar upazila to get overview of livelihood of fish traders, fish distribution and marketing systems, constraints of fish distribution and marketing etc. A total of 9 FGD sessions (6 in town markets and 3 in village markets) were conducted where each group size of FGD was 5 to 10 intermediaries. And 3) Crosscheck interviews with key informants: Crosscheck interviews were conducted with key informants such as school teachers, local leaders, Upazila Fisheries Officer (UFO) and relevant NGO workers where information was contradictory or requested for further assessment. The collected data were tabulated using conventional statistical tools. Data were analyzed using MS Excel 2007.
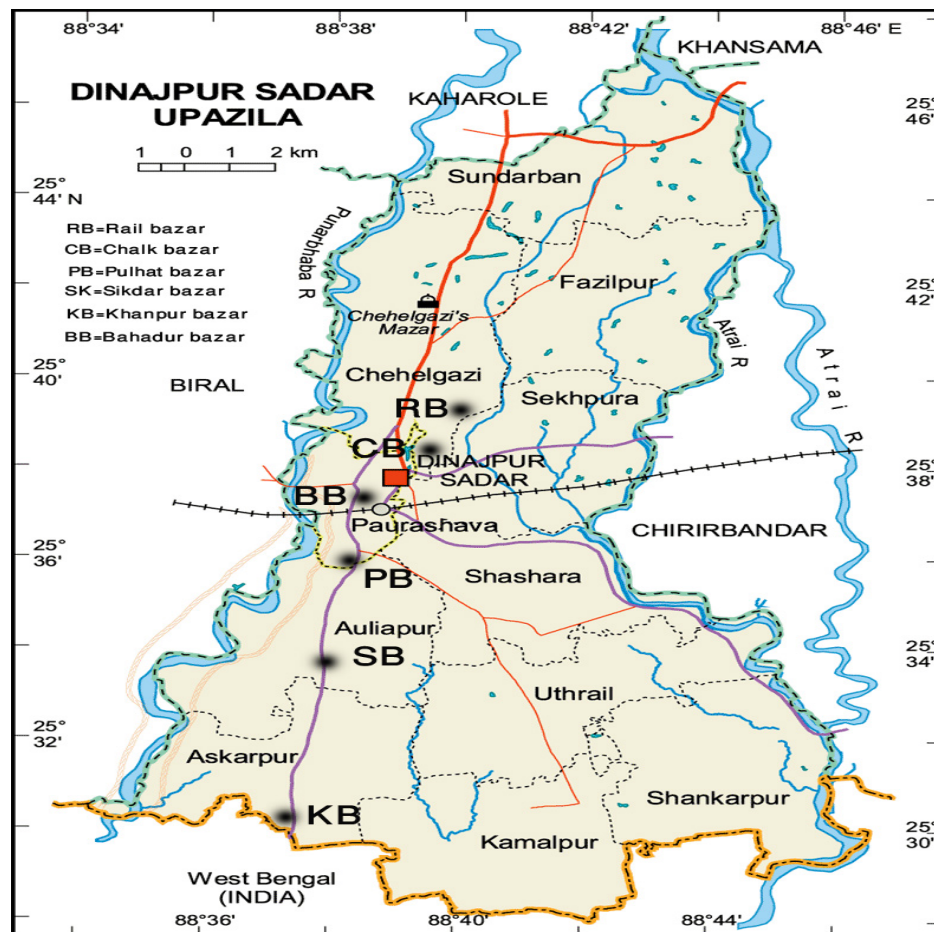

Fig 1: Map of Dinajpur sadar upazila showing the fish markets. (Source: Banglapaedia) (BB= Bahadur bazaar, RB= Rail bazaar, CB= Chalk bazaar, PB= Pulhat bazaar, SK= Sikder bazaar, KB= Khanpur bazaar)

Sample sizes in six different markets
The sample size of six different markets is given in table 1.

Study area	No. of fish traders
Bahadur bazaar	10
Chalk bazaar	10
Rail bazaar	10
Pulhat bazaar	10
Sikder bazaar	10
Khanpur bazaar	10
Total	60

Result
A large number of people are concerned with fish production, distribution and marketing systems in Dinajpur sadar. The main aim of this study is to describe the present status of fish marketing system of fish and fishery products in Dinajpur

sadar. This description is based on secondary data and primary data collected in six different markets of Dinajpur sadar upazila.

Marketing system and fish distribution
A marketing system includes all activities involved in the flow of goods from the points of initial production to the ultimate consumer. It includes the exchange activities associated with transferring property rights to commodities, physically purchasing and allocating resources, handling, products, disseminating information to participants and institutional arrangements for facilitating these activities. The market chain from farmer to consumer passes through a number of intermediaries, such as: local fish traders (*paikers*), wholesalers and retailers.
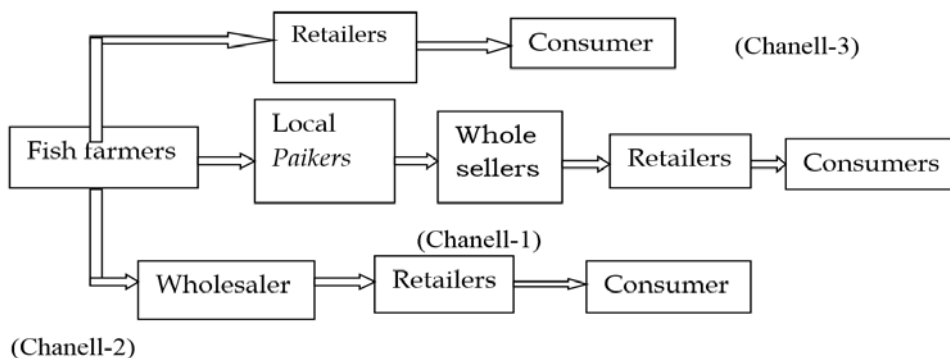

Fig 2: Fish marketing chain from farmers to consumers in Dinajpur sadar.

Marketing Portion in Primary to consumer market
Normally fish farmers do not directly communicate with consumers. Market communication was usually being made through middlemen. Farmers partially sold their fish directly to the wholesalers (about 15%); the wholesalers sold it to the retailers. The *paikers* carried the fish (about 80%) to the markets by their own or the retailers. In a very rare case, farmers carried the fishes to the markets and sold them to the retailers.
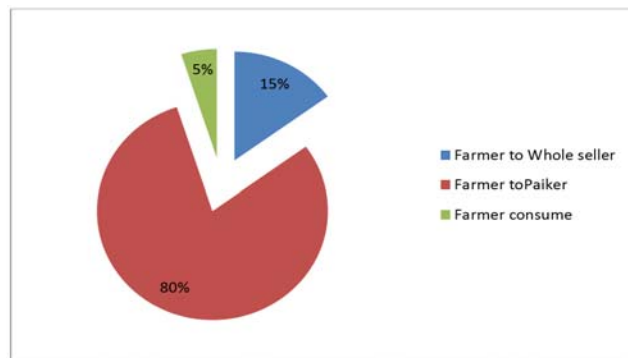

Fig 3: Marketing portion

A total of 60 retailers were interviewed for market survey stated that price of fish depend on market structure, species and size of fishes. They also noted that price varies according to freshness, supply and demand of fish. There are seasonal variation in prices with the highest in summer (March to May), and lowest in pre-wint: (September to November) during the fish harvesting season.

Consumers or local traders are not willing to pay high prices for exotic carps due to less demand or taste of the fish. The highest average price of Indian major carps was noted for rohu (Tk. 350). Among the exotic carps the highest price was found for grass carp. However, the prices of cat fish were so high because of taste and demand. The price of fish is given in figure below.
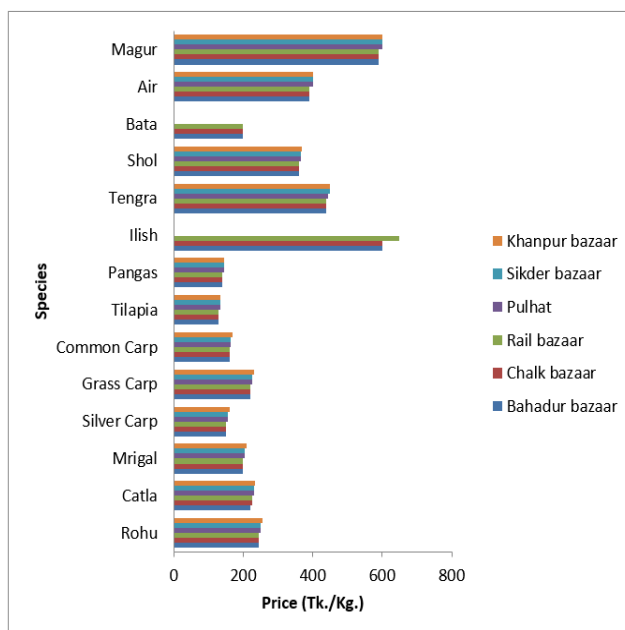

Fig 4: Major fish species and their average retail prices (Tk. /Kg) in different markets

Dry fish species

Different types of fish were found in these fish markets. They were salted and dry fish. Mainly two types of fish such as freshwater (inland and brackish) and marine water species were dried

Table 2: List of dry fish species (freshwater species) observed in the fish markets in Dinajpur sadar upazilla.

Family	Local name	Species
1. Gobiidae	Bele, baila	*Glossogobius giuris*
2. Nandidae	Meni, Bheda	*Nandus nandus*
3. Siluridae	Boal	*Wallago attu*
	Madhu pabda	*Ompok pabda*
4. Channidae	Shol	*Channa striatus*
	Taki	*Channa punctatus*
5. Ambassidae	Chanda	*Chanda nama*
6. Engraulidae	Phasa	*Setipinna phasa*
	Chapila	*Gudusia chapra*
7. Bagridae	Air	*Sperata aor*
	Tengra	*Mystus vittatus*
8. Cyprinidae	Chela	*Salmostroma argentae*
	Darkina	*Esomus danricus*
	Mola	*Amblypharyngodon mola*
	Sarpunti	*Puntius sarana*
	Jatpunti	*Puntius sophore*
	Titpunti	*Puntius ticto*
9. Penaeidae	Horina chingri	*Metapenaeus monoceros*
10. Clupeidae	Katchki	*Corica soborna*

Table 3: List of marine dry fish species observed in the fish markets in Dinajpur sadar upazila.

Family	Local name	Species
1. Clupidae	Choukka	*Pellona ditchela*
	Chandana ilish	*Hilsa toli*
2. Centropomidae	Bhetki	*Lates calcarifer*
3. Stromatidae	Rup chanda	*Pampus chinensis*
4. Polynamidae	Lakhua	*Leptomelanosoma indicus*
5. Mugilidae	Bhangon	*Mugil cephalus*
6. Harpodontidae	Loitta	*Harpadon nehereus*
	Fasha	*Thryssa purava*

Season and time of fish trading

More or less the season of fish trading is year round. The traders of Bahadur bazaar, Pulhat are engaged in fish trading from 7am to 10pm while in Railbazar, Chalk bazaar from 7am to 6pm and in Khanpur bazaar, Sikder bazaar traders are engaged in fish trading from 12pm to 8pm. It was found that almost all traders of six markets spend around 8 to 12 hours in fish selling if sufficient fishes are available. But some traders can sell their fish earlier and engage themselves in other homestead works.

Amount of fish sold

During the survey it was found that fish traders in Bahadur bazaar sold an average 120 kg daily while in Chalk bazaar 110 kg, in Rail bazaar 90 kg, in Pulhat bazaar 75 kg, in Sikder bazaar 60 kg and in Khanpur bazaar 40 kg. Amount of fish sold are given below in figure 5.
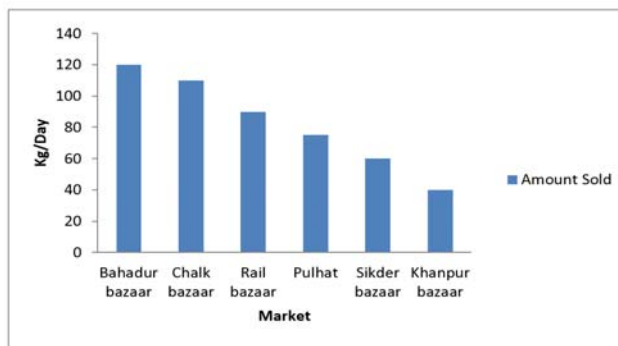

Fig 5: Amount of fish sold

Number of Retailers

There are 80-90 retailers involved in Bahadur bazaar, 30-40 retailers in Chalk bazaar, 40-50 retailers in Rail bazaar, 7-10 retailers in Pulhat bazaar, 10-12 retailers in Sikder bazaar, 7-10 retailers in Khanpur bazaar.

Supply of Fish

The daily supply of total fish was 10.2 tons (average 85 traders x 120kg) in Bahadur bazaar, 3.85 tons in Chalk bazaar (average 35 traders x 110kg), 4.05 tons in Rail bazaar (average 45 traders x 90kg), 0.6 tons in Pulhat bazaar (average 8 traders x 75kg), 0.66 tons in Sikder bazaar (average 11 traders x 60kg), and 0.32 tons in Khanpur bazaar (average 8 traders x 40kg) respectively.

Profit of fish retailers

According to the survey, it was found that the average income of fish retailers in Bahadur bazaar was Tk. 400 per day, Tk. 350 per day in Chalk bazaar, Tk. 350 per day in Rail bazaar, Tk. 300 per day in Sikder bazaar, Tk. 350 per day in Khanpur bazaar. The percentage of profit is shown in figure.
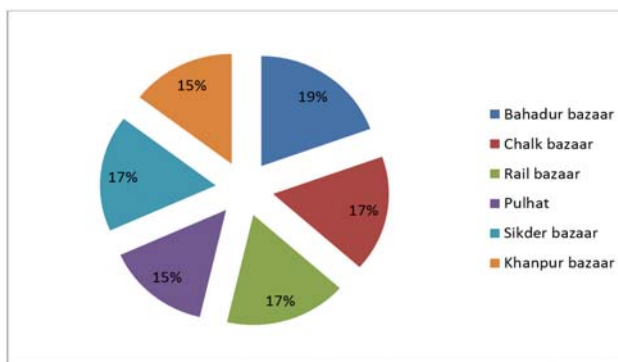

Fig 6: The percentage of profit

Income of wholesalers

The wholesalers are influential persons in the fish markets and they have a strong relationship with other intermediaries. Wholesalers engage themselves a short period (2 to 3 hours) for fish selling as middlemen and earn a considerable amount of money in comparison with retailers. They earned about Tk. 350 to 600 per day, and engaged themselves a long time in marketing activities.

Price of fishes

In the study area, fish prices were determined by actions at Arat level. In retail levels prices were determined by open bargaining between retailers and consumers. Captured carp in Bangladesh are more expensive than cultured carp. Among the

cultured species rohu, catla and mrigal fetched higher prices than exotic carps. The reason for low prices of exotic carps can be explained by low demand and poor taste but an important factor is lower production costs to allow supplying fish at this price. Naturally the price of carp depends on market structure, species, size and quality. Survey of six markets showed that the prices per kilogram of carp increased with size for both Indian major carps (i.e; rohu, catla and mrigal) and exotic carps (silver carp, grass carp and common carp). All the traders enjoyed low bargaining power because of the product perish-ability and need for cash. When the demand for the products was high and supply was limited, then the price was high and vice-versa.

Problems in fish marketing
During the survey fish traders stated a number of fish marketing problems. It included higher transport costs, poor road communication facilities, inadequate drainage system, poor supply of ice, poor water supply, unhygienic condition, poor sanitary facilities, lack of capital, higher demand of labors, exploited by middlemen, lack of storage facilities, lack of marketing facilities, lack of market information etc. According to retailers, political disturbances sometimes affect fish transport as well as marketing. As a result, perishable fishes get damage and the traders are to sell these at a cheaper price; sometimes they even fail to get any return, due to decomposition of fishes. Fish traders were asked to mention to top most problems as they fell regarding fish marketing. Where, 20% of the respondents identified unhygienic market place 25% poor supply of ice, 15% lack of capital, 15% exploited by middlemen, 25% mentioned inadequate drainage system, were the most important problems for fish marketing.

Livelihood status of fish retailers
The aim of this study was to determine the socio-economic status of retailers. Especially, emphasized was given on such variable namely age, religion, education, family size, housing condition, sanitary facilities, health facilities, electricity facilities, and other socio economic issues.

Age distribution
In the study area the fish retailers were classified into different age groups such as 15 to 30 years, 31 to 40 years, 41 to 50 years, 51 to above years. Out of total surveyed fish retailers in Dinajpur sadar maximum were in the age group of 31 to 40 years (33.33%), whereas only 16.67% were found in the group of above 51 years. Age distribution of traders are given in figure 7.
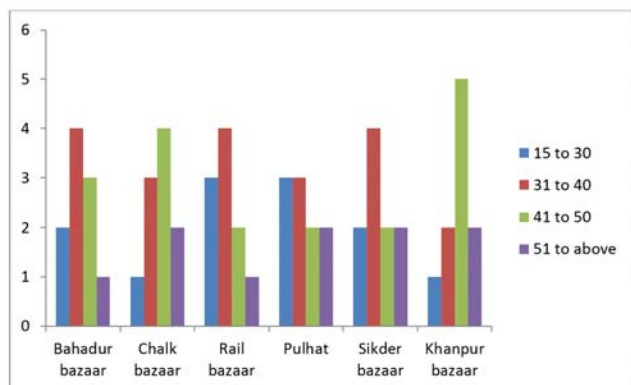

Fig 7: Age distribution of retailers

Educational status
The level of education of the fish retailers in the study area are shown in the figure. The figure reveals that the highest percentage of fish retailers was primary educated and only 18.33% are secondary educated. Educational status of traders are given in figure 7.
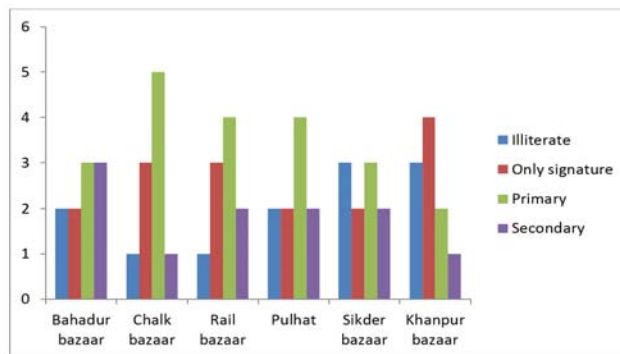

Fig 8: Educational status of retailers

Family size
The family size of the surveyed fish retailers were divided into three categories according to the number of the family members - <5, 5-10 and >10. The highest percentage in the group of <5 was found in the studied areas whereas lowest percentage in the group of >10 was found. Family size of retailers are given below in figure 9.
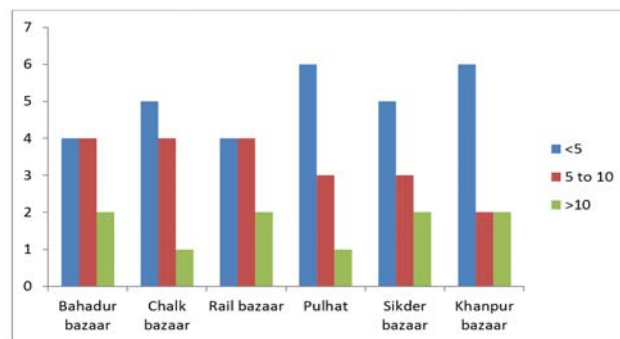

Fig 9: Family size of retailers

Religion
From the study it was found that maximum fish retailers in the Dinajpur sadar fish markets were Muslims (68.33%) and the rest them were Hindus (31.67%). It was also found that the highest percentage Muslim fish retailers were found in Khanpur bazaar and the highest percentage Hindus fish retailers were found in Chalk bazaar fish market. Religion status of retailers are given below in figure 10.
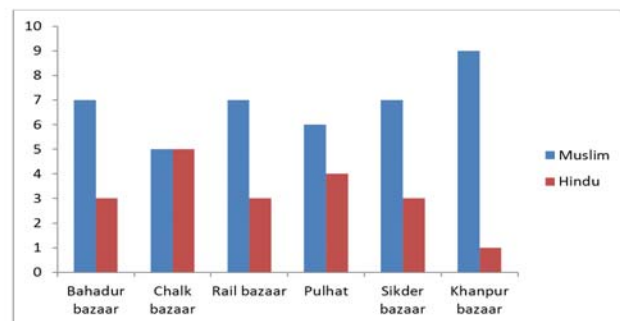

Fig 10: Religion status of retailers

Housing condition
Fish retailers in Dinajpur sadar were found to live in different types of houses which were grouped into Kacha (43.33%), Semi-pacca (26.67%), Pacca (30%). The highest percentages of kacha house were found in the study areas. Housing condition of retailers are given below.
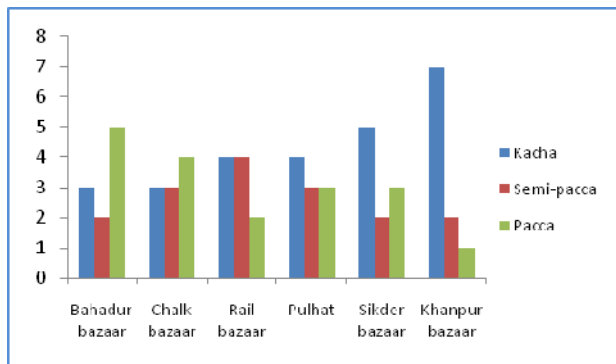

Fig 11: Housing condition of retailers

Drinking water facilities
Among the fish retailer, 80% use tube-well water for drinking water and the remaining 20% used river, pond and canal water. It was found that highest percentage (90%) of respondent use tube well water in Pulhat and Khanpur bazaar. Drinking water facilities of retailers are given below.
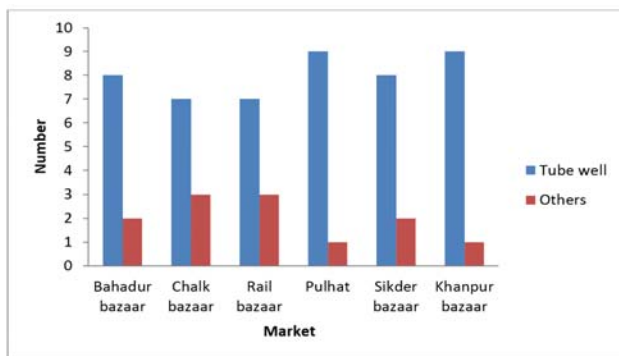

Fig 12: Drinking water facilities of retailers

Electricity facilities of fish retailers
From the study, it was found that 78.33% of the surveyed fish retailers have electricity facilities, whereas 21.67% live without electricity facilities (Table 6). Maximum fish retailers in Bahadur bazaar (90%), Pulhat bazaar (90%) has this facility, whereas Khanpur bazaar (60%) fish retailers lower electricity facilities.
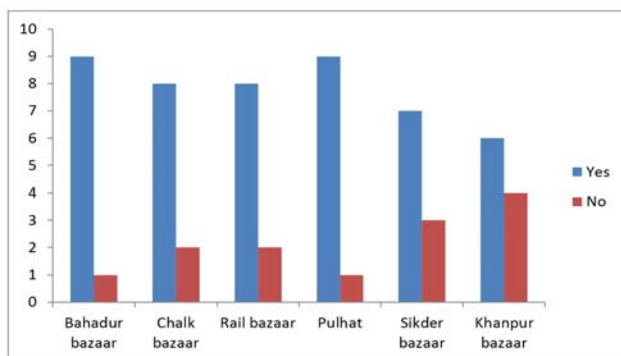

Fig 13: Electricity facilities of retailers

Annual household income
The selected fish retailers were grouped into four categories to the level of their annual income. The first category included the fish retailers having annual income> Tk. 10,000. The 2nd, 3rd and 4th categories had income levels of Tk. 10,000-50,000; Tk. 51,000-1, 00,000 and >1, 00,000 respectively (Table 4.13). The study revealed that 56.67% had below 2nd category and 43.33% had below 3rd category. It was also found that, annual income of maximum fish retailers were found between Tk. 10,000-50,000 in Dinajpur sadar markets.
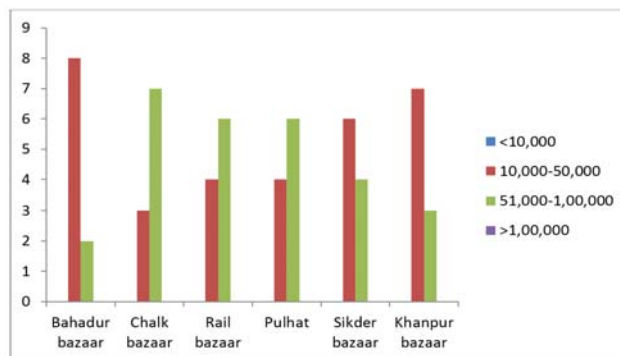

Fig 14: Annual household incomeof retailers

Discussion
Fish farming is regarded as industry in many countries of the world but the fish farmers in our country do not communicate directly with the consumers. Length and type of fish market chain from the producers to final consumer varies significantly. This chain passes through a number of intermediaries such as local fish traders, *beparies, aratder,* wholesalers and retailers. In our present study three types of marketing channels were found. These channels were (a) Fish farmer–paikers- wholesalers-retailers-consumers, (b) Fish farmers- wholesalers –retailers- consumers, and (c) Fish farmers–retailers- consumer. The present findings are in agreement with the result of Quddus (1991) [5], Rahman (2003) [6], Mia (1996) [3] who identified several types of marketing channels in Netrokona, Mymensingh and Gazipur district respectively, all of which involved active participation of *aratdar* and *beparies* as a strong link in the existing marketing system. The above observations are in conformity with our findings.
From our survey it was found that the wholesalers make a significant amount of profit. Generally they make a profit of Tk. 350-600 per day. The wholesalers invest more capital than the retailers, and as such, they have greater control over the agent and retailers. The present findings are in agreement with the report of Rahman (2003) [6] who observed similar scenario in Gazipur Sadar and Sripur Upazila markets.
The price of fish varies with the types of species, sizes, freshness, market demands and seasons. Usually the prices of fishes are higher in April to July when the fish are in short supply. On the contrary, prices remain lower during November to January which seemed to be related with the increased availability of both captured and cultured fishes during this period (Quddus, 1991) [5]. It has been found that the price of Indian major carps always remain higher than the exotic carps. This difference in the prices of fishes might be related with the flesh texture and taste of the local fishes. Rahman (2003) [6] reported that major carps such as rohu, catla and mrigal fetched higher price than exotic carps in Gazipur district. Quddus (1991) [5] concluded that fish price is influenced by

seasonal abundance, market structure and origin of fishes. Ranadhir (1995) [7] reported that rohu was the most expensive fish followed by catla, mrigal, common carp and grass carp in the southeast Bangladesh. Our present findings are in agreement with the above reports.

In our study fish market and marketing environment were found to be manifested with a large number of constraints. These are higher transport costs, poor road communication facilities, inadequate drainage system, poor supply of ice, poor water supply, unhygienic condition, poor sanitary facilities, lack of capital, higher demand of labors, exploited by middlemen, lack of storage facilities, lack of marketing facilities, lack of market information etc. They also mentioned that political disturbances may also affect fish transporting as well as marketing of fish. As a result, the fish get damage and traders become bound to sell these at a cheap price, and even they fail to earn any return for decomposition of fish. Rahman (2003) [6] described that traders of Gazipur faced the problems of higher transport cost, exploitation by middlemen, poor ice supply and lack of money as well as political disturbances. A very much similar situation was also observed by Dasgupta (2004) [2] and Paul (2006) [4] in Mymensingh and Rajshahi district.

From the study it was found that Muslim fish traders (68.33%) were predominant. Siddique (2001) [9] mentioned that Muslim fish traders were predominant in the market of Mymensingh. Rahman (2003) [6] noted that in Gazipur the highest percentage of fish traders up to 30 age groups. It is noteworthy that mostly the fish traders in all level of marketing chain have educations at some level. Among the total 60 traders interviewed, 20% were illiterate, 26.67% can sign only, 35% have primary level education, 18.33% have secondary level education and none of them had bachelor level of education. Mia (1996) [3] found that most of the fish traders had secondary level of education in his study in Mymensingh town. On the contrary, Dasgupta (2004) [2] reported that majority of the fish traders in Fulpur upazila had primary level of education. The apparent difference in the education level of the fish traders seems to be related the locality and proximity to district town. Young people particularly the Muslims are coming to the fish marketing business in increased number. Active participation of the young educated people in fish marketing network was also observed by other researchers.

Improvement of the existing physical infra-structure in terms of drainage, water supply, icing facilities etc. in the fish markets are required to ensure hygienic and good quality of fishes for the consumers at reasonable price.

Conclusion
The study was conducted in six fish markets (three in villages and three in towns) in Dinajpur sadar upazila and its nearby area namely, Bahadur bazaar, Rail bazaar, Chalk bazaar, Pulhat bazaar, Sikder bazaar, Khanpur bazaar. The objective of the study were to analyze the existing system of fish marketing with particular emphasis on socio-economic condition of fishermen, to identify the problems associated with fish marketing and to suggest the remedial measures for marketing problems.

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